

An Overview of Mangrove Rehabilitation Efforts in Jamaica

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Introduction-Mangroves



- Flowering plants which dominate, tropical, sheltered intertidal zones
- Have special adaptations to survive in these harsh environments
- Viviparous seedlings(not seeds), with water borne dispersal
- facultative halophytes (do not require salt water to live but are able to tolerate it) : *excrete or reduce salt intake*
- specialized roots with spongy aerenchyma tissue (Hogarth, 2007) and lenticels (Tomlinson, 1986)
- Have support roots and buttresses (Duke,1992)

Human/Mangrove Interactions are historical, vital, continuous...sustainable?

- 2 major airports construction, numerous marinas
- Flood water retention(Black River, Portmore
- Eco-tourism: Black river Safari (*500 per day**)
- nutrient filter(Falmouth, Hellshire, Kingston)
- Wind-break for various shipping interests(cruise, bulk, trans-shipment, marinas etc): Coastal cities and towns
- Recreational and cultural(small vessel safety, tours, “crab-bush”, bird watching, *bird-shooting* etc)
- **Majority of Jamaica’s coastal towns have coastal forest origins**

Port Royal, Palisadoes and Kingston Harbour environs



Mangrove Threats

- Mangroves globally are threatened: mostly through land reclamation(dumping for economic development and human comforts) and other anthropogenic actions (pollution etc.)
- Mariculture accounts for 52% of current mangrove loss worldwide (Variela, 2001)
- Mangroves are also degraded through natural catastrophes such as hurricanes and tsunamis worldwide
- **Wetland forests (mangroves) account for only 2% of Jamaica's land mass : Jamaica has lost over 2000 hectares of mangroves between 1989 and 2010(NEPA, 2013).....and less than 1% are protected**

Oyster Bay-Trelawny (2017)

- Trelawny parish has lost over 160 hectares of mangrove forest between 2005 and 2010 (NEPA, 2010)



Figure 3: Final coverage of Wetland along the coast of Falmouth as per results of verification exercise



Photos: Dayne Buddo

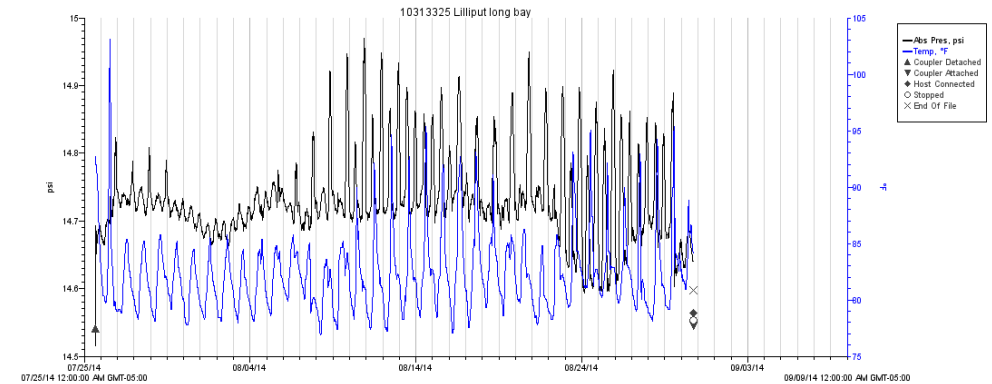
Why doesn't it grow?

- majority of **mangrove restoration** attempts worldwide have “failed but are not well documented”; “mangrove gardening” instead of an ecological rehabilitation approach (Lewis, 2005).
- An ecological mangrove restoration : the act of regaining the functions of the ecosystem by reversing/correcting any prevailing physical factors that were preventing that forest from regaining pre-disturbance state and characteristics



Key factors: Hydrology=Topography=Tidal “liberation”

- **Tidal heights** (degree of wetting) using an Onset (U20-001-01-Ti) Hobo water level logger: placed at the observed/apparent high tide reference area and at the highest elevation of the impact sites.

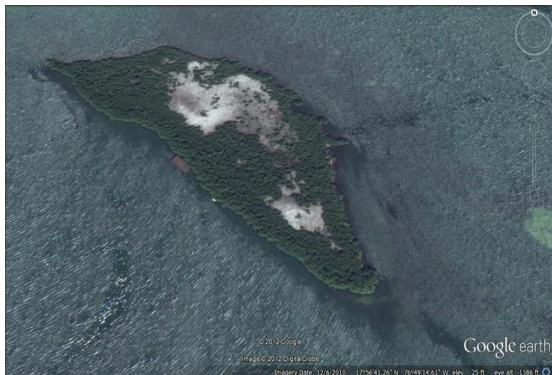


- **Topographic surveys** - spot heights to calculate slope of degraded areas (and periphery of control site) and substrate volumes; **more advanced methods exist*



“Recent” mangrove forest failure/death/degradation

- Grazing of seedlings/saplings by cattle(e.g. goats in Portland Cottage)
- Hurricane damage- changes in original hydrology, breaks trees (many do not recover/coppice e.g. Red mangroves). *Recovery times understudied* Hurricane Hugo-78% decline in Guadeloupe
- **Solid waste- breakage, tangling etc. affects growth(Kgn sites)**
- Agricultural and aquaculture conversions(reversible)
- Civic developments(lack of culverts, reclamation)



The mangrove rehabilitation approach should be specifically tailored, based on deterrents

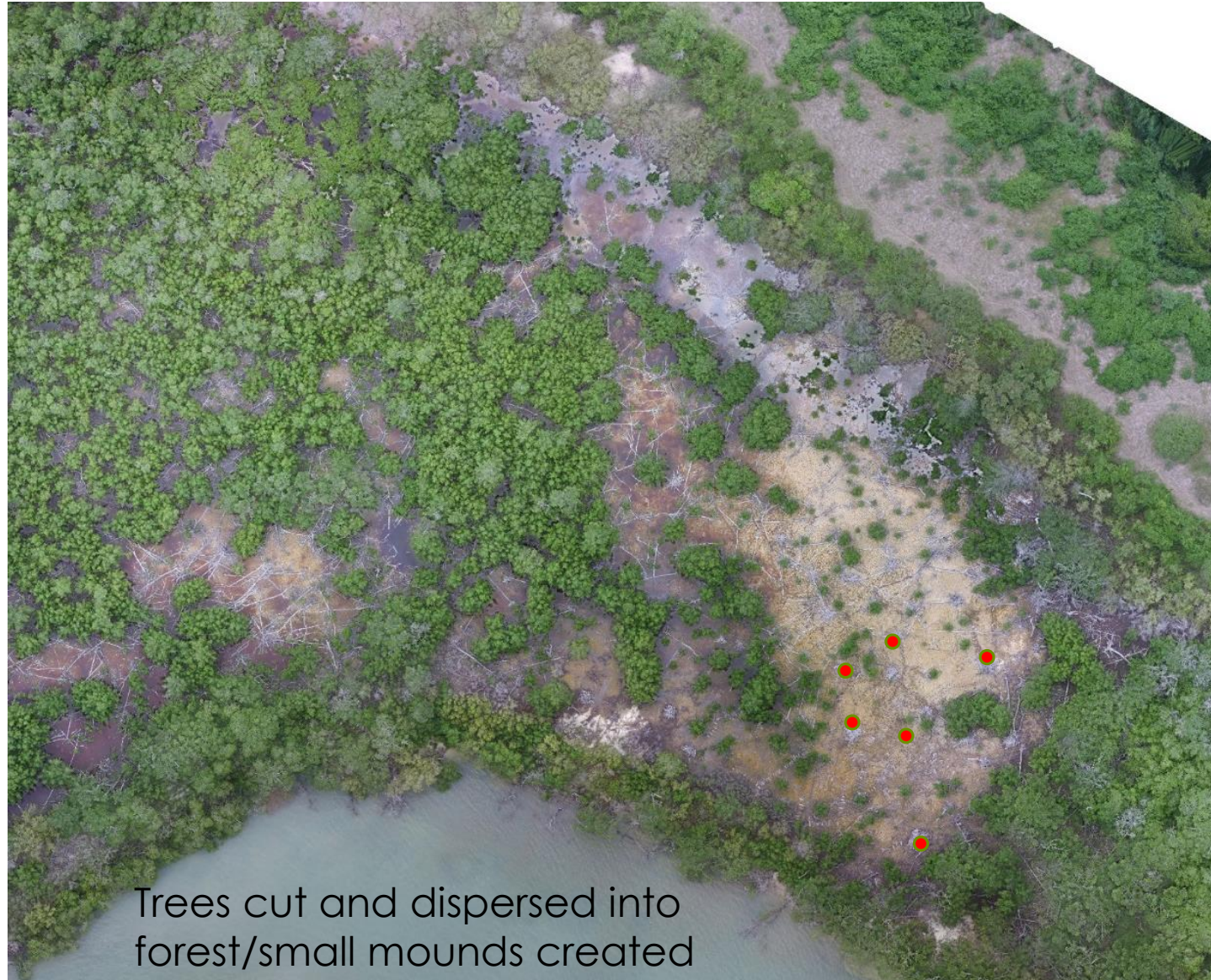
- **Slope (cut and/or fill) and/or drainage corrections** : Airport Runway(AR), Bogue, Lilliput, *Boggy Pond**, *Winn's Morass*
- **Solid waste segregation from regenerating forest**: Airport Runway and Palisadoes, Malcolm's Bay*
- **Human management** (*adherence to building permit system, **charcoal management**, alternative livelihood/uses in the area, **community outreach**, **fencing(goats)**)- Falmouth, Portland Cottage



Pre and post clean-up of hurricane damaged site

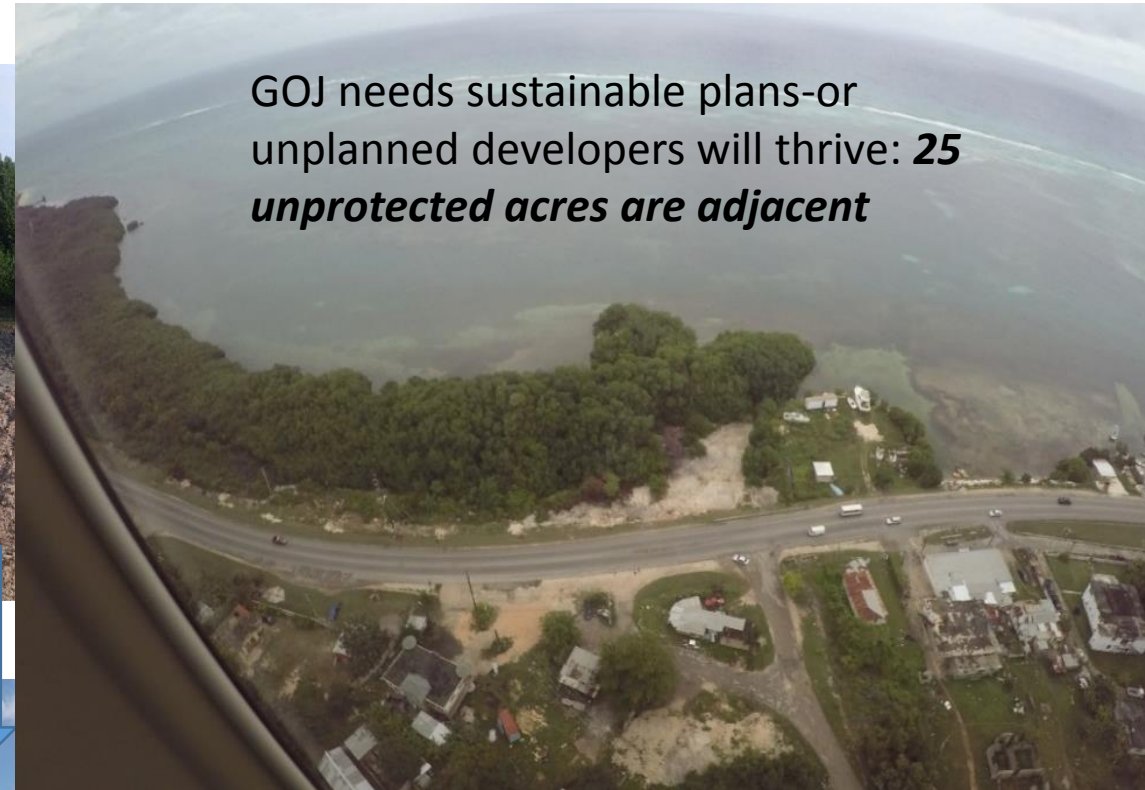


Malcolm's Bay-2016



Trees cut and dispersed into
forest/small mounds created

Lilliput-St. James. Pre-emptive steps(conservation) urgently needed to have sustainable coastal towns



Lilliput-24 months

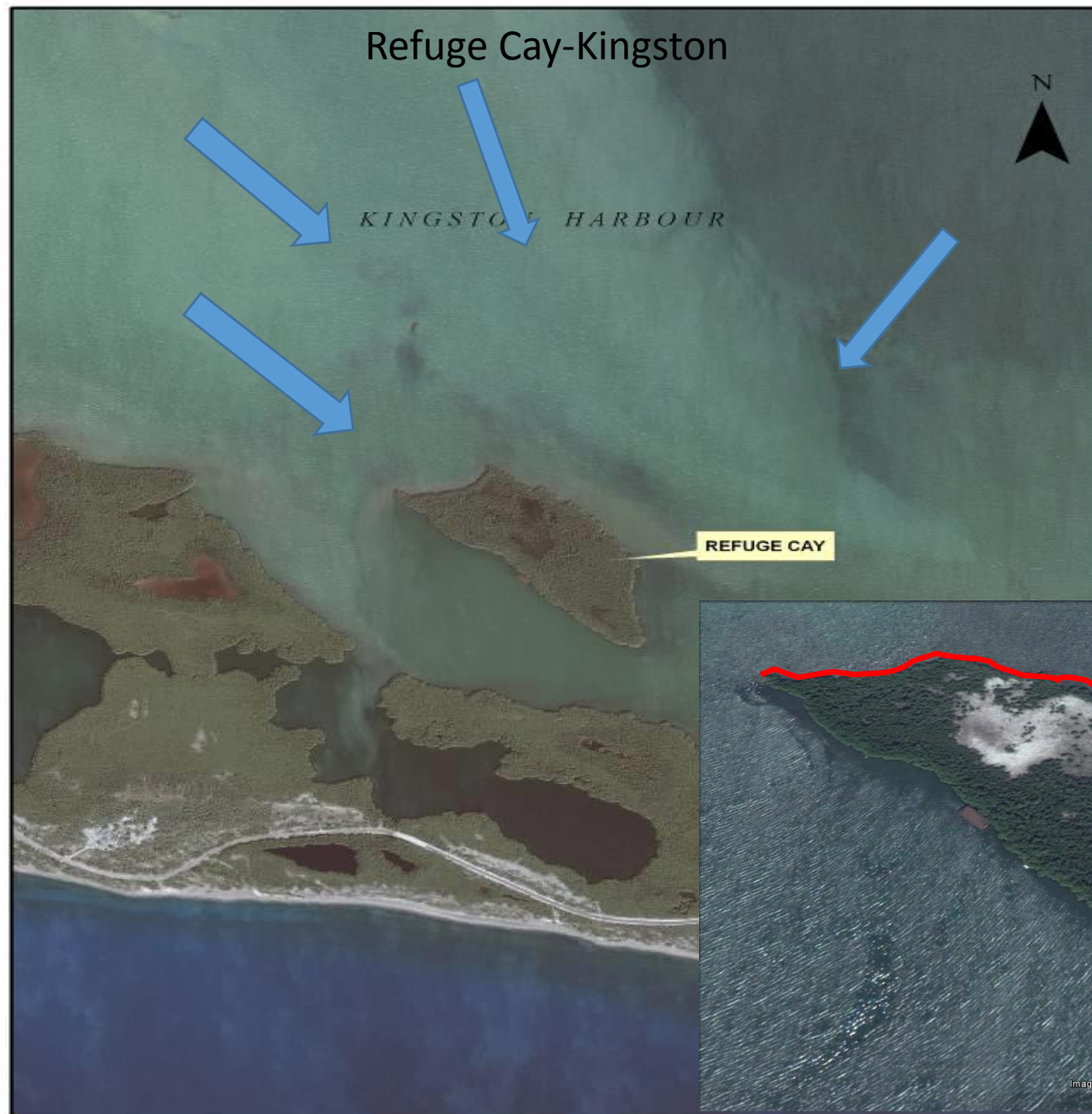


Solid waste management(70% of project budget) key to mangrove sapling survival



- ✓ 70% survival over **12 months**
- ✓ Flowering *Avicennia*
- ✓ Increase in monitoring indices (height, # leaves)
- ✓ Faunal recruitment(snails, fishes, birds, **people ***)

- Govt. agency paused payments (no cleaning, fence breached)
- No new seedlings survive (despite falling from parents)
- **40% overall survival(18 months survey)**

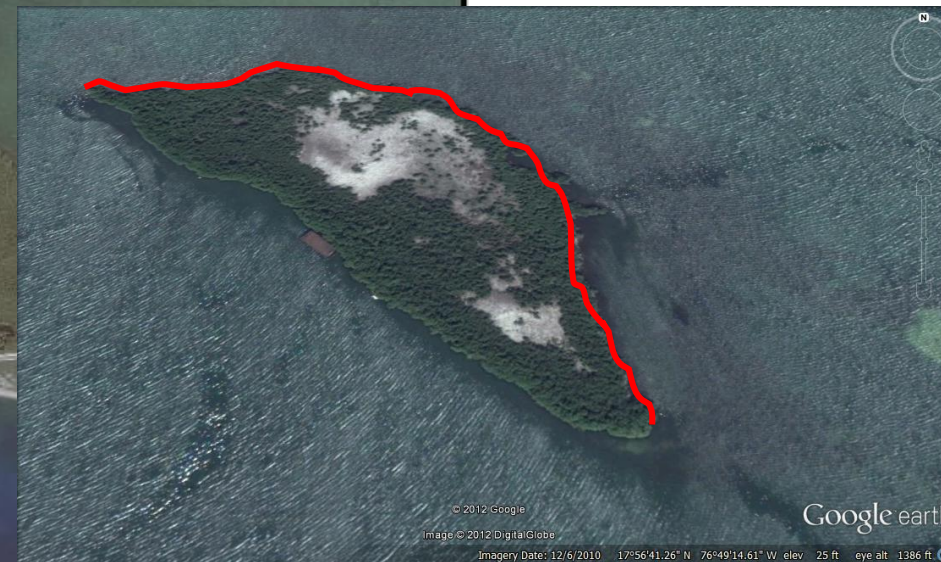


Map of Refuge Cay 2002.

Scale 1cm =122.4km



Brown Pelican resting on solid waste on the harbour side of Refuge Cay.



2011

Portland Cottage-progress and partnerships



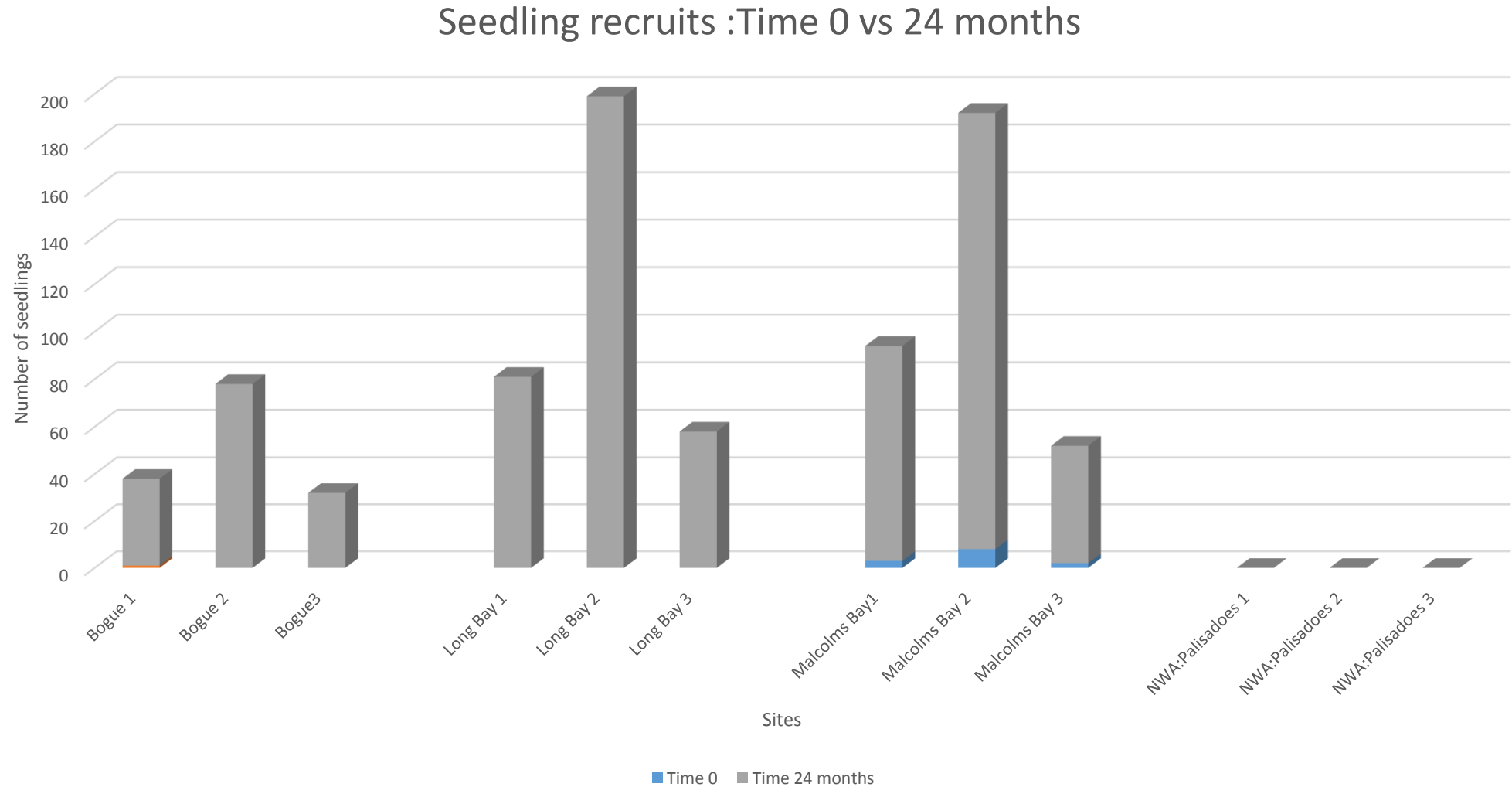
Time 0

After 24 months

Transplants: 40% survival

Recruits: 127% increase

Early Results- from 4 pilot sites



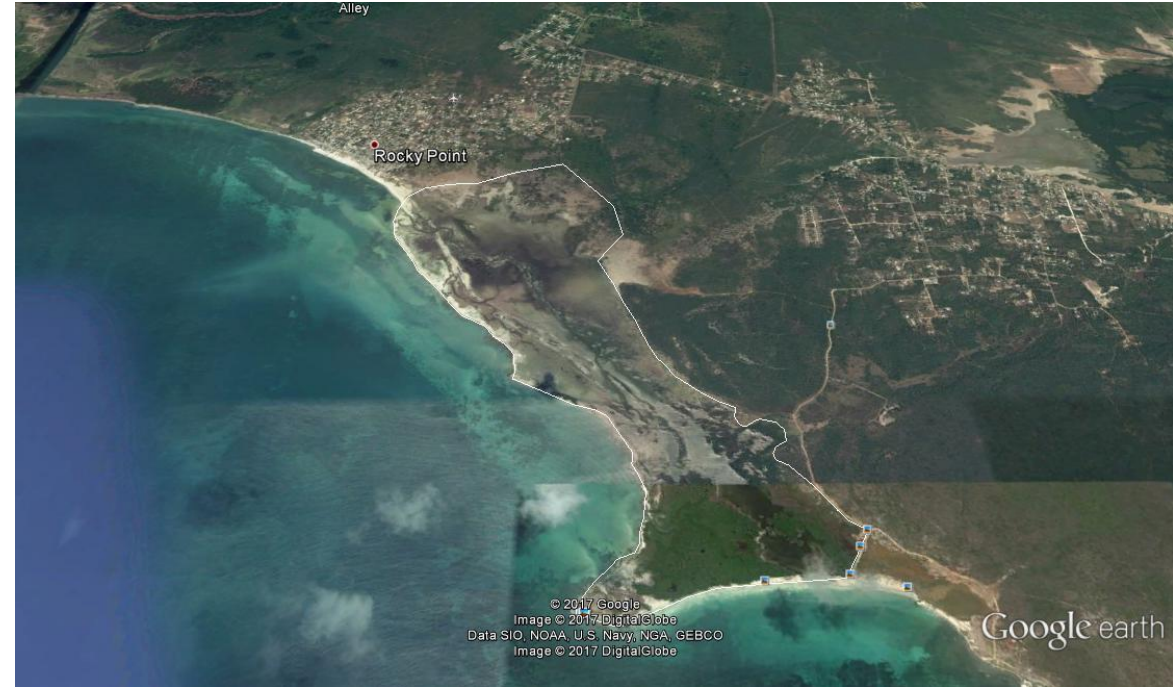
Next steps: Pre-emptive rehab. in St. James



54 acres: 12 acres pristine, 20 acres of informal settlements

Jackson Bay- Rocky Point Mangroves

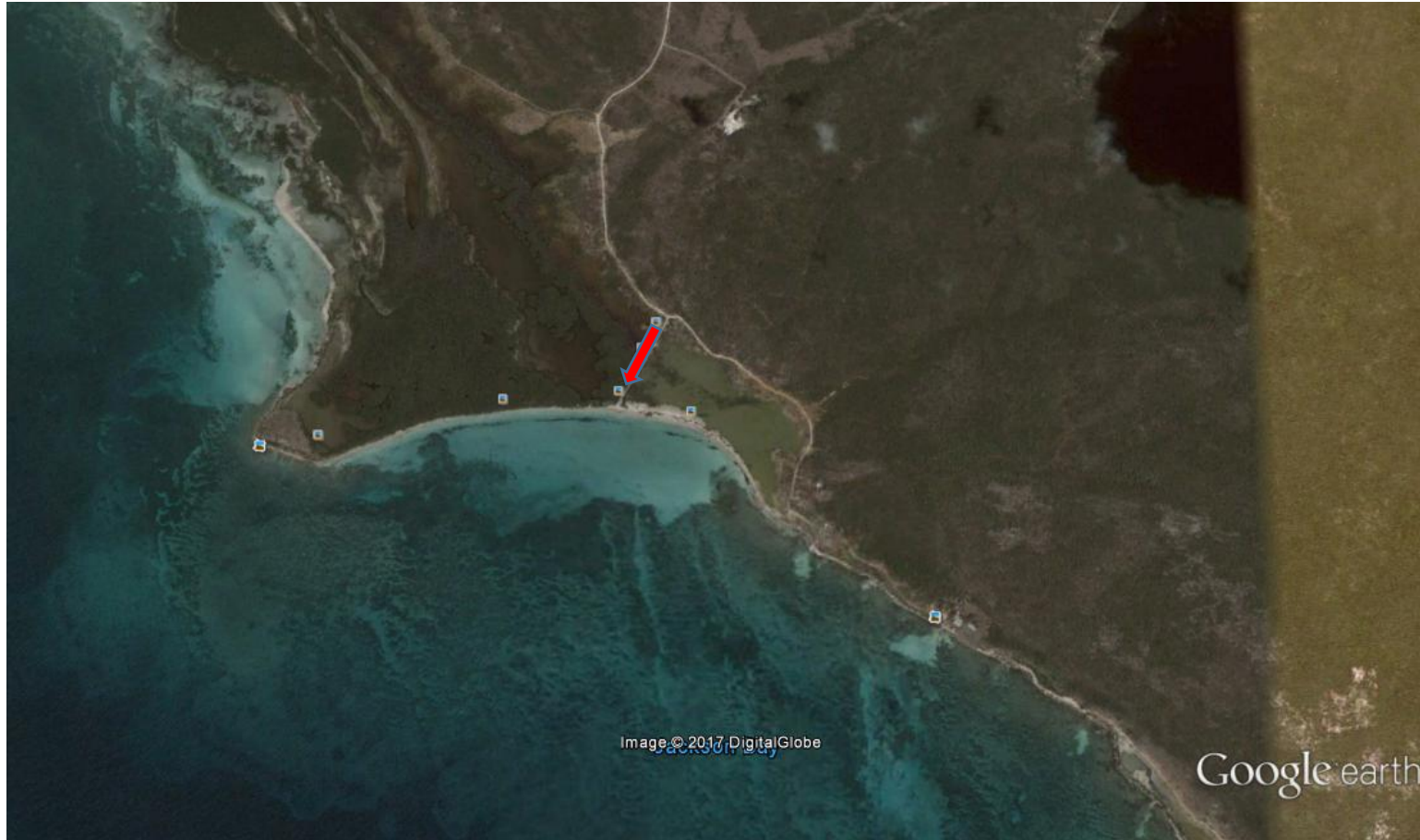
loss of over 600 acres of mangrove forest: closure of sugar company*



19 acres reduced to 1 acre in 15 years



Jackson Bay Beach



Need to re-open drainage connection-road has cut off mangrove connection

THANK YOU



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